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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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12/19/2005

Jochen Von Hagen

10808/202

9257

48581

7590

09/11/2006

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EXAMINER

ZHU, JOHN X

ART UNIT

PAPER NUMBER

2858

DATE MAILED: 09/11/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/519,659		VON HAGEN, JOCHEN	
	Examiner		Art Unit	
	John Zhu		2858	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 August 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Response to communications filed on 8/4/2006 in which claims 1, 6 and 8 were amended.

Drawings

2. The drawings are objected to because blocks 101 and 102 in Figure 1 lack a descriptive label. More specifically, please write in the block 101 a direct-current source and block 102 an AC voltage source. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 8-12 are rejected under 35 U.S.C. 101 because the claimed invention lacks patentable utility. It is noted that a tangible result is not realized in the method claims. Calculating and determining the resistance values in and of themselves are not tangible results. A step is needed to convey the results, i.e. outputting, displaying, storing, etc.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-5 and 8-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi (5,291,142).

With respect to claims 1 and 8, Ohmi discloses an electromigration test apparatus and method comprising a DC source (DC current supply means, column 3,

lines 50-51), an AC voltage source (AC current supply means, column 3, lines 51), a circuit electrically coupled to the DC source and AC source (Column 2, lines 10-19) receiving DC and AC signals, a measuring device detecting an electrical parameter which is indicative of the electromigration in the structure to be tested (Column 3, lines 37-43), the direct-current source being set up to expose the structure to conditions which accelerate electromigration (Column 4, lines 42-46), and AC voltage is set up that it exposes the conductive structure to an AC current, superposed on a DC current (read as independent currents) that thus heats up the structure to be tested (Column 2, lines 15-20/Column 3, lines 50-54).

Although Ohmi does not explicitly disclose the DC and AC current supply means as being voltage sources. It is well known in the art that many DC and AC currents are applied from DC and AC voltage sources. Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to specify the DC and AC current supply means as DC and AC voltage sources for the purpose of supplying a current to heat the interconnect pattern under test (Column 2, lines 15-19).

With respect to claims 2 and 9, Ohmi further discloses the electrical parameter being measured as the resistance of the pattern under test (Column 3, lines 37-43).

With respect to claims 3 and 4, Ohmi further discloses the evaluation unit having a voltage measuring device (Fig. 3, voltmeter 17), a current measuring device (Ammeter 15) and a control device (Computer 18). Although Ohmi does not explicitly disclose the

voltage and current measuring device implemented in such a way that a root-mean-square current through the conductive structure and a root-mean-square-voltage across the conductive structure to be tested can be detected, or the control device control device controls the AC voltage source in such a way to keep the structure temperature constant, applicant is reminded that while features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function alone. In the instant case, it is believed Ohmi recites the above structural limitations of the application.

With respect to claims 5 and 12, Ohmi further discloses the conductive structure to be tested is arranged on a semiconductor wafer (Column 3, lines 3-29).

With respect to claim 10, Ohmi discloses all aspects of the claim except for explicitly disclosing measuring the RMS current and voltage value and determine a power value therefrom. However, it implicitly follows that the resistance determining means of Ohmi would use measured current and voltage values to determine resistance, especially RMS values in the presence of AC voltages and currents. Furthermore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the measured values of voltage and current as taught by Ohmi to determine the total amount power applied to the structure under test until structure/device failure.

With respect to claim 11, Ohmi further discloses regulating the temperature of the structure to be tested being regulated to a constant value (Column 1, line 44) by means of an evaluation unit (Fig. 1, temperature controller 11).

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi as applied to claim 1 above, and further in view of Suzuki et al. (6,223,686 B1).

With respect to claim 6, Ohmi discloses all aspects of the claim except for integrating a DC source to a pulse generator to provide an AC current superposed on a DC current.

Suzuki discloses a DC source (Fig. 1, DC source 17) integrated with a pulse generator (Pulse generator 18) to provide an AC current superposed on a DC current (Column 2, lines 35-37).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the integration of the DC source and pulse generator as taught by Suzuki into the system of Ohmi for the purpose of applying a superposed current to a substrate under test.

7. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ohmi as applied to claim 1 above, and further in view of Schwarz et al. (4,483,629).

With respect to claim 7, Ohmi discloses all aspects of the claim except for a heating furnace for heating the conductive structure to be tested.

Schwarz discloses a furnace (Fig. 1, furnace 10) used to heat the device under test.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the furnace as taught by Schwarz into the system of Ohmi for the purpose of providing a temperature ramp which dynamically exposes a conductor operating under currents tree to a linear rise in temperature (Abstract, lines 4-7).

Response to Arguments

8. Applicant's arguments filed 8/4/2006 have been fully considered but they are not persuasive.

The applicant provided no argument on the 35 U.S.C. 101 utility rejections.

The applicant argues against the rejection of independent claims 1 and 8 and the deficiencies of the primary reference Ohmi. *"The above-noted passage of Ohmi indicates that the first current and second current are not concurrent. Ohmi therefore does not disclose a concurrent, overlapping AC and DC current."* (Page 9)

In response, it is noted that the features upon which applicant relies (i.e., concurrent and overlapping) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). In fact, these limitations are not explicitly disclosed in the specification either. If the applicant believes concurrent and overlapping is implied by the newly added

limitation of "the AC current is independent of the DC current and is ***superposed*** on the DC current" (emphasis added), the Ohmi reference still meets the limitation by the disclosure of the second current supply means which can superimpose on a DC current an AC current (Column 3, lines 50-54). The independence between the DC current and AC current is inherently present in the superimposed limitation. Thus, a DC supply, an AC supply, an independent DC current and an independent AC current imposed on it are all explicitly disclosed by Ohmi.

Conclusion

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Zhu whose telephone number is (571) 272-5920. The examiner can normally be reached on M-F, 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Hirshfeld can be reached on (571) 272-2168. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JZ

John Zhu
Examiner
Art Unit 2858



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